



November 9, 2018

Claudia Young Smith  
Air Program, Mail Code 8P-AR  
US Environmental Protection Agency Region 8  
1595 Wynkoop Street  
Denver, Colorado 80202

RE: Tribal NSR Synthetic Minor Registration Modification

Dear Ms. Smith,

Van Hook Gathering Services, LLC (VHGS) is submitting the enclosed modification to the Tribal New Source Review (NSR) Registration for the Van Hook Gathering System CDP oil and natural gas production facility originally submitted by WPX Energy Williston, LLC on December 30, 2013, which was modified in December 2014 and September 2016. This modification is based on the addition of five (5) produced water storage tanks and a heater treater associated with the recently installed Pennington saltwater disposal facility at this location. The produced water throughput has been updated to reflect projected production. All required forms and backup documentation are included with this submittal.

If you have any questions regarding this submittal, please feel free to contact me at [loren.fuller@mcpoperating.com](mailto:loren.fuller@mcpoperating.com) or at 713-457-8307.

Sincerely,

A handwritten signature in blue ink, appearing to read "Loren Fuller".

Loren Fuller  
Project Manager  
Van Hook Gathering Services, LLC

Enclosure:

cc: Three Affiliated Tribes Environmental Division

Prepared for:

**Van Hook Gathering Services, LLC**

Submitted to:

**US Environmental Protection Agency Region 8  
Air Program**

Prepared by:

**Ramboll US Corporation**

Date:

**November 2018**

# **FEDERAL NEW SOURCE REVIEW MODIFICATION FOR SYNTHETIC MINOR SOURCE REGISTRATION**

## **VAN HOOK GATHERING SYSTEM CDP AND PENNINGTON SWD**

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## CONTENTS

<b>ACRONYMS AND ABBREVIATIONS</b>	<b>3</b>
<b>1. INTRODUCTION</b>	<b>4</b>
<b>2. PROCESS DESCRIPTION AND PROCESS FLOW DIAGRAM</b>	<b>4</b>
<b>3. EMISSION SUMMARY</b>	<b>8</b>
3.1 Emission Calculations	8
3.1.1 Gas and Liquid Analyses	8
3.1.2 Produced Water Storage Tank Emissions	8
3.1.3 Natural Gas External Combustion Unit Emissions	8
3.1.4 Flare Emissions	8
3.1.5 Greenhouse Gas Emissions	9
<b>4. COMPLIANCE WITH FEDERAL AND TRIBAL NSR SYNTHETIC MINOR REGISTRATION REQUIREMENTS</b>	<b>14</b>
4.1 Emissions and Operating Limits	14
4.2 Monitoring and Recordkeeping	14
4.3 Compliance With Federal Requirements	14

## TABLES

Table 2-1. Summary of Emissions Sources
Table 3-1. Proposed Allowable Maximum Air Pollutant Emission Rates
Table 3-2. Uncontrolled PTE Maximum Air Pollutant Emission Rates
Table 4-1. Greenhouse Gas Emission Rates
Table 4-2. Federally Applicability Standards

## FIGURES

Figure 1-1 Site Location
Figure 2-1 Process Flow Diagram

## APPENDICES

Appendix A - Tribal NSR Registration Form for Existing Sources (Form REG)
Appendix B - Emission Calculations
Appendix C - Laboratory Analyses

## ACRONYMS AND ABBREVIATIONS

40 CFR	Title 40 of the United States Code of Federal Regulations
AP-42	EPA's AP-42, Compilation of Air Pollutant Emission Factors, Fifth Edition
AQRV	Air Quality Related Value
bbf	Barrel
BRE	Bryan Research & Engineering
BWPY	Barrels of Water Per Year
CH <sub>4</sub>	Methane
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
DRE	Destruction and Removal Efficiency
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
FBIR	Fort Berthold Indian Reservation
FIP	Federal Implementation Plan
GHG	Greenhouse Gas
GWP	Global Warming Potential
H <sub>2</sub> S	Hydrogen Sulfide
HAP	Hazardous Air Pollutant
lb	Pound
lb-mol	Pound-Mole
ICE	Internal Combustion Units
MACT	Maximum Achievable Control Technology
VHGS	VHGS Operating
Mg/yr	Megatons per year
MMbtu/hr	Million British Thermal Units per hour
N <sub>2</sub> O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standard
NAIC	North American Industrial Classification System
NE	North East
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NO <sub>x</sub>	Oxides of Nitrogen
NSPS	New Source Performance Standards
NSR	New Source Review
OGI	Optical Gas Imaging
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
tpy	Tons Per Year
SO <sub>2</sub>	Sulfur Dioxide
SWD	Salt Water Disposal
VHGS	Van Hook Gathering Services
VHGS CDP	Van Hook Gathering Systems CDP
VOC	Volatile Organic Compound

## 1. INTRODUCTION

Van Hook Gathering Services, LLC (VHGS) is submitting this modification to the existing registration to add additional equipment to the Van Hook Gathering System CDP (VHGS CDP), a central gathering facility for oil and produced water from the VHGS pads in the Van Hook area. The VHGS CDP is an oil and natural gas production facility under the Fort Berthold Indian Reservation (FBIR) Federal Implementation Plan (FIP) under the permitting authority of the Environmental Protection Agency (EPA) Region 8 Federal Minor New Source Review (NSR) Program in Indian Country under 40 CFR §49 Subpart K. A saltwater disposal and underground injection well (Pennington SWD) was recently installed at the location. The facility is adding additional produced water storage tanks and a heater treater as part of the Pennington SWD.

This update is being submitted for the installation of five (5) additional produced water tanks and one (1) 0.75 million British Thermal Units per hour (MMBtu/hr) heater. The facility will remain a true minor source for Prevention of Significant Deterioration (PSD) and because the facility is subject to the FBIR FIP there is an enforceable limit for controlling the tank vapors with a 98% flare which makes the facility a synthetic minor source for Title V permitting. The registration for existing sources form (Form REG) is included in Appendix A.

The VHGS CDP is located in the east half of the North East (NE) quarter of Section 2, Township 150 North, Range 92 West, Mountrail County, on the FBIR in North Dakota. The facility is situated on an approximately ten-acre site, with an elevation of approximately 2,000 feet (mean sea level). The surrounding area is mainly used for agriculture and livestock grazing. A site location map is shown in Figure 1-1.

The facility remains a minor source with respect to both PSD review as well as the Federal Operating Permits Program (Title V) as defined in 40 Code of Federal Regulations (CFR) §52.21(b)(1) and 40 CFR §71.2 Subpart A. As summarized in Table 3-1, the potential to emit (PTE), calculated as defined in 40 CFR §49.152 and 40 CFR 52.21(b)(1) for non-named sources, for each criteria pollutant is less than 250 tons per year (tpy). Federal major NSR and PSD review are not triggered. Additionally, Title V permitting requirements will not be triggered since the Title V major source thresholds, as defined in 40 CFR §71.2, are not exceeded: 100 tpy for each criteria pollutant, 25 tpy for total hazardous air pollutants (HAPs), 10 tpy for any single HAP.

Enclosed are the required registration materials consisting of the following: a process description, process flow diagram, emission calculations, laboratory analyses, REG forms and other documentation supporting the emissions estimates.

## 2. PROCESS DESCRIPTION AND PROCESS FLOW DIAGRAM

The VHGS CDP is an integrally connected central gathering facility for oil and produced water from the VHGS pads in the Van Hook area of the FBIR. The initial flash emissions will continue to occur at the upstream well pads before the oil and water are piped to the VHGS CDP. For purposes of estimating PTE emissions from this facility, the maximum potential water production from existing and proposed wells in the Van Hook area was used. The operating hours will be 24 hours, 7 days a week, 365 days per year. The facility is requesting to handle up to 10,000 barrels per day of produced water.

The modification consists of the following additional equipment:

- Five (5) - 400 bbl Produced Water Tanks (Tanks 31-35); and
- One (1) - 750 MMBtu/hr Heater Treater (HT-2).

A summary of the equipment is listed in Table 2-1.

The oil and produced water from the Van Hook wells are transported to the oil and produced water tanks at the VHGS CDP by pipeline at atmospheric pressures. During normal operations the oil and produced water is transferred from the tanks to sales by pipeline, but truck loading stations are provided for when the pipeline is unavailable.

At the produced water handling section of the facility, the water is received at two inlet surge tanks that feed into an electrically heated gun barrel tank. Oil that is skimmed off in the gun barrel tank is put into two oil tanks and the produced water is fed into five produced water tanks.

If produced water containing residual oil or oil containing water is received at the facility, a heater treater will be used to process the liquid for additional separation. The volatile organic compound (VOC) in the materials processed in the heater treaters will have already been flashed at the well pads so there will be minimal VOC emissions. As an additional precaution, any gas produced at the heater treater will be piped to the Steffes flare. Working and breathing losses from the produced water tanks are routed to a Steffes flare.

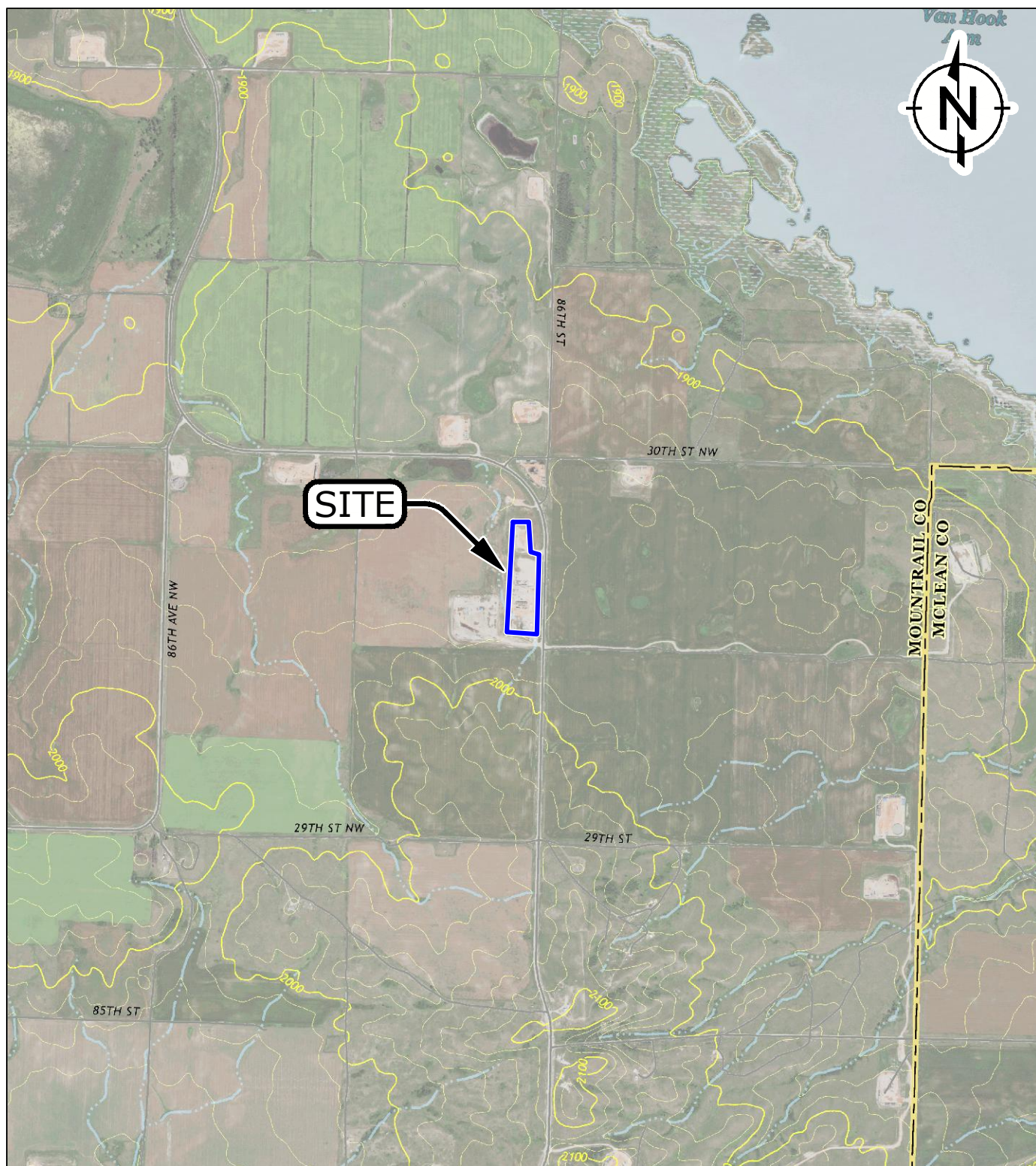
The stored oil is transported for sale either by a pipeline or a truck loadout. Produced water is stored in the on-site water storage tanks until it is injected into the SWD well.

The facility diagram is shown in Figure 2-1.

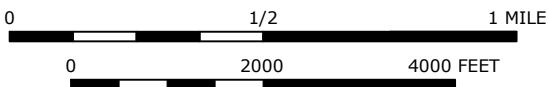
<b>Table 2-1. Summary of Equipment</b>			
<b>Equipment ID</b>	<b>Equipment Description</b>	<b>Capacity/Design Rate</b>	<b>Controls</b>
Tank 31	Produced Water Storage Tank	400 bbl	Flare
Tank 32	Produced Water Storage Tank	400 bbl	Flare
Tank 33	Produced Water Storage Tank	400 bbl	Flare
Tank 34	Produced Water Storage Tank	400 bbl	Flare
Tank 35	Produced Water Storage Tank	400 bbl	Flare
HT-2	Heater Treater Burner	0.75 MMBtu/hr	None




M:\CAD\1690008888\_MCP - Van Hook and Whiting\PHI01\_Site Location Map (Van Hook - New Town ND).dwg



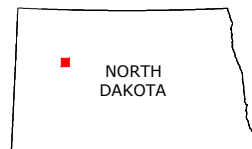
CONTOUR INTERVAL 10 FEET



**LEGEND:**

 PROPERTY BOUNDARY  
(APPROXIMATE)

**SOURCE:**  
2018 USGS 7.5 Minute Series New Town SW, North Dakota Topographic Quadrangle.  
Site Location; N: 47.843338° W: 102.408397° WGS84



QUADRANGLE LOCATION

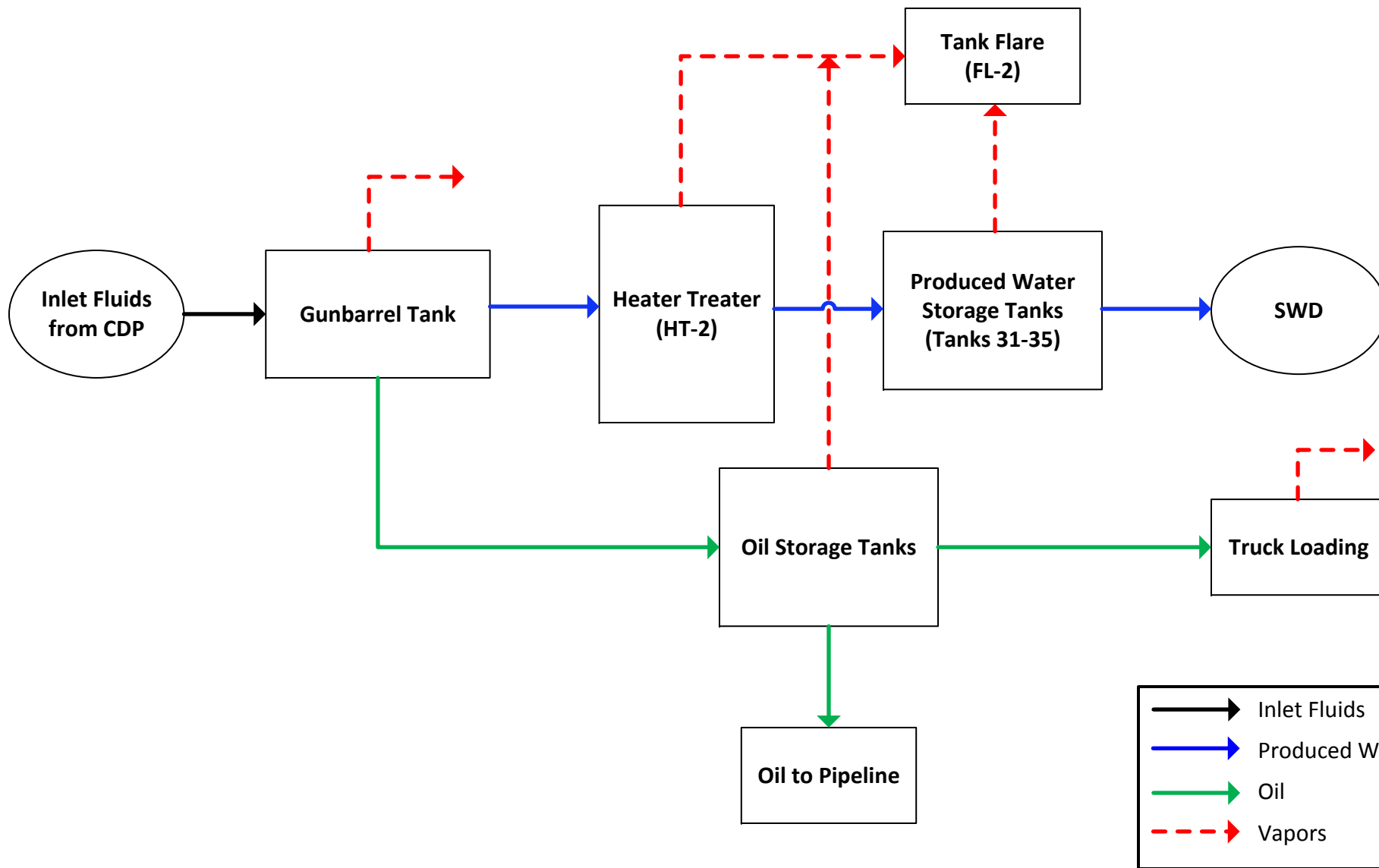


DRAFTED BY: HJW

DATE: 6/28/18

**SITE LOCATION MAP**  
VAN HOOK CENTRAL DELIVERY POINT  
AND PENNINGTON #1 SWD  
MCP OPERATING  
NEW TOWN, NORTH DAKOTA

**FIGURE**  
**1-1**



**FIGURE 2-1  
PROCESS FLOW DIAGRAM  
Pennington SWD Tank Battery**

Van Hook Gathering Service, LLC, Mountrail Co, ND

Prepared by:



November 2018



### 3. EMISSION SUMMARY

The maximum allowable air pollutant emission rates proposed for each emission source at the Facility are presented in Table 3-1, and the maximum uncontrolled PTE air pollutant emission rates are presented in Table 3-2. Detailed emission calculations for the proposed equipment and operations are presented in Appendix B.

The production rates for the facility assume all of the produced water production from the Van Hook wells is piped to the facility. Emissions from the VHGS CDP make the facility a true minor source for PSD and a minor source for Title V permitting. The basis for the PTE emissions is detailed in the following sections.

#### 3.1 Emission Calculations

Emissions of VOCs from the produced water tanks working and breathing losses were calculated using the ProMax Process Simulator published by Bryan Research and Engineering (BRE). The process simulator calculation tables are provided in Appendix B.

##### 3.1.1 Gas and Liquid Analyses

The composition and physical properties of an oil sample collected from a VHGS CDP oil tank were used in the simulation. The laboratory analysis is provided in Appendix C. It was assumed that 1% of the produced water would contain oil.

##### 3.1.2 Produced Water Storage Tank Emissions

Emissions of VOC, Hydrogen sulfide ( $H_2S$ ), and HAPs from the produced storage tanks were estimated using BRE ProMax Process Simulator. This model accounts for both flash emissions from the change in liquid stream pressure from the separator to ambient conditions and the working and breathing losses. The emissions are based on the maximum annual production rates for oil and water, operating pressures and temperatures of separator vessels, and the material analyses discussed in Section 3.1.1. The maximum annual rate of water is based on monthly production rates from 2018. Hourly working/breathing emissions and annual tank working/breathing emissions are conservatively based on the maximum storage tank liquid surface temperature. The VOC emissions from the produced water storage tanks at the facility are controlled by a flare (FL-1) with a 98% control efficiency.

##### 3.1.3 Natural Gas External Combustion Unit Emissions

The heater treater burner (HT-2) is rated to a maximum capacity of 0.75 MMBtu/hr. Emissions from the heater treater burner was estimated using emission factors from EPA AP-42 Chapter 1.4 *Natural Gas Combustion*, dated July 1998, for small boilers for all pollutants except Sulfur dioxide ( $SO_2$ ) and  $H_2S$ , the maximum design heat input rating, and annual hours of operation. The emissions are based on AP-42 factors and assume a runtime of 8,760 hours per year. Sweet field gas from the field gathering system is used to fuel the heater treater burner. Total annual usage of this gas for the burner will be 6.44 million standard cubic feet per year (MMscf/yr).

Emissions of  $SO_2$  were calculated based on the maximum  $H_2S$  content of the sweet field gathering system gas (4 ppmv), the maximum firing rate of the fuel gas, and conservatively assuming 100% conversion to  $SO_2$ . Similarly,  $H_2S$  emissions were based on the maximum  $H_2S$  content of the gas and maximum firing rate of the fuel gas and assuming 98% conversion to  $SO_2$ .

##### 3.1.4 Flare Emissions

Produced water storage tank emissions are controlled by the tank flare (FL-1). Controlled emissions from the flare were estimated using the maximum expected flow rate and heating value of each stream routed to the flare. The gas flow includes a pilot gas stream of natural gas. The maximum flow rates and heating values were estimated using ProMax and are provided in Appendix B.

Emissions factors for nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO) used emission factors from AP-42 Table 13.5-1 *Emissions Factors for Flare Operations*. PM and PM<sub>2.5</sub> emission factors used emission factors from AP-42, Table 1.4-1 and 1.4-2, July 1998. SO<sub>2</sub> emissions assume 100% conversion of H<sub>2</sub>S to SO<sub>2</sub>. Emissions of SO<sub>2</sub> were calculated based on a mass balance from H<sub>2</sub>S concentration in the produced gas, and a maximum annual produced gas volumetric flow rate. The flare is designed to be in compliance with 40 CFR §60.18 specifications and as such, are assumed to operate with a destruction and removal efficiencies (DRE) of 98%.

### **3.1.5 Greenhouse Gas Emissions**

Greenhouse Gas (GHG) emissions from the storage tanks at the Facility were calculated for carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) from mass balances. GHG emissions from the external combustion unit was estimated using GHG factors from AP-42, Table 1.4.2 *Emission Factors for Criteria Pollutants and GHG from Natural Gas Combustion*. GHG emissions from the flares were calculated based on the gas heat input rates and the CO<sub>2</sub>, CH<sub>4</sub>, and nitrous oxide (N<sub>2</sub>O) emission factors for fuel gas provided in 40 CFR Part 98 - Mandatory GHG Reporting, Subpart C, Tables C-1 and C-2. Equivalent carbon dioxide emissions (CO<sub>2</sub>e) were estimated based on individual GHG emissions and the Global Warming Potentials (GWP) provided in 40 CFR Part 98, Subpart A, Table A-1.

**Table 3-1. Maximum Air Pollutant Emission Rates**

Emission Source	Equipment ID	VOC		NO <sub>x</sub>		CO		PM <sub>10</sub>		PM <sub>2.5</sub>	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05
Produced Water Tank	Tank 32	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05
Produced Water Tank	Tank 33	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05
Produced Water Tank	Tank 34	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05
Produced Water Tank	Tank 35	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05
Heater Treater Burner	HT-2	4.04E-03	0.02	0.07	0.32	0.06	0.27	0.01	0.02	0.01	0.02
TOTAL EMISSIONS		0.01	0.05	0.07	0.33	0.07	0.29	0.01	0.02	0.01	0.02

**Table 3-1. Maximum Air Pollutant Emission Rates (cont'd)**

Emission Source	Equipment ID	SO <sub>2</sub>		H <sub>2</sub> S		Benzene		Formaldehyde		HAP	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 32	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 33	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 34	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 35	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Heater Treater Burner	HT-2	4.41E-04	1.93E-03	4.84E-06	2.12E-05	1.54E-06	6.76E-06	5.51E-05	2.42E-04	1.39E-03	0.01
TOTAL EMISSIONS (Excluding Fugitives):		4.41E-04	1.93E-03	4.84E-06	2.12E-05	1.33E-05	5.82E-05	5.51E-05	2.42E-04	1.65E-03	0.01

**Table 3-2. Uncontrolled PTE Maximum Air Pollutant Emission Rates**

Emission Source	Equipment ID	VOC		NO <sub>x</sub>		CO		PM <sub>10</sub>		PM <sub>2.5</sub>	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	0.06	0.28	--	--	--	--	--	--	--	--
Produced Water Tank	Tank 32	0.06	0.28	--	--	--	--	--	--	--	--
Produced Water Tank	Tank 33	0.06	0.28	--	--	--	--	--	--	--	--
Produced Water Tank	Tank 34	0.06	0.28	--	--	--	--	--	--	--	--
Produced Water Tank	Tank 35	0.06	0.28	--	--	--	--	--	--	--	--
Heater Treater Burner	HT-2	4.04E-03	0.02	0.07	0.32	0.06	0.27	0.01	0.02	0.01	0.02
TOTAL EMISSIONS		0.32	1.40	0.07	0.32	0.06	0.27	0.01	0.02	0.01	0.02

**Table 3-2. Uncontrolled PTE Maximum Air Pollutant Emission Rates (cont'd)**

Emission Source	Equipment ID	SO <sub>2</sub>		H <sub>2</sub> S		Benzene		Formaldehyde		HAP	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 32	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 33	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 34	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 35	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Heater Treater Burner	HT-2	4.41E-04	1.93E-03	4.84E-06	2.12E-05	1.54E-06	6.76E-06	5.51E-05	2.42E-04	1.39E-03	0.01
TOTAL EMISSIONS (Excluding Fugitives):		4.41E-04	1.93E-03	4.84E-06	2.12E-05	5.88E-04	2.58E-03	5.51E-05	2.42E-04	0.01	0.06



## **4. COMPLIANCE WITH FEDERAL AND TRIBAL NSR SYNTHETIC MINOR REGISTRATION REQUIREMENTS**

### **4.1 Emissions and Operating Limits**

VHGS is proposing to limit the PTE of the Facility emissions by limiting the annual the annual produced water throughput to 10,950,000 barrels of produced water per year (BWPY). Additionally, VHGS is requesting to establish federally enforceable limits by controlling the produced water tanks with the flare.

The flare operates with a 98% destruction efficiency for VOC and H<sub>2</sub>S emissions, as described in section 3.1.2. As summarized in Table 3-2, the uncontrolled PTE rates for VOC are less than 250 tpy with the throughput limitation. The flare as required under 40 CFR §49.4164 is a practically enforceable limit (as defined in 40 CFR §49.152) which limits PTE less than the major source threshold of 250 tpy for criteria pollutants, as defined in 40 CFR §52.21. With the proposed federally enforceable limits on PTE, PSD requirements will not be triggered since the major source thresholds under 40 CFR §52.21 are not exceeded. Emissions of GHG are presented in Table 4-1, and detailed calculations are provided in Appendix B.

With the proposed federally enforceable limits on PTE, the Title V major source thresholds are not exceeded. VHGS will comply with the necessary requirements for EPA Region Part 71 Federal Operating Permits.

### **4.2 Monitoring and Recordkeeping**

VHGS will comply with the monitoring, recordkeeping and reporting requirements as prescribed in 40 CFR §§49.4166 – 49.4168.

### **4.3 Compliance With Federal Requirements**

A summary of the Federal Standard Applicability is provided in Table 4-2.

Table 4-1. Greenhouse Gas Emission Rates									
Emission Source	Equipment ID	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		CO <sub>2</sub> e	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 32	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 33	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 34	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 35	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Heater Treater Burner	HT-2	88.24	386.47	1.69E-03	0.01	1.62E-03	0.01	88.76	388.77
TOTAL GHG EMISSIONS:		89.73	393.04	1.77E-03	0.01	1.62E-03	0.01	90.26	395.34

Table 4-2. Federal Standard Applicability		
Federal Standard	Name	Applicability
New Source Performance Standards		
NSPS Kb	Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	<p>This subpart applies to storage vessels for petroleum liquids before custody transfer which have a storage capacity greater than 42,000 gallons (10,000 barrels) that were constructed after July 23, 1984.</p> <p><i>All tanks at this facility will have a storage capacity &lt;1,589.874 cubic meters (10,000 barrels). Therefore, the storage vessels are not affected facilities under §60.110b(d)(4), and NSPS Subpart Kb is not applicable to the facility.</i></p>
NSPS Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	<p>This subpart applies to each steam generating unit greater than 10 MMBtu/hr but less than 100 MMBtu/hr constructed after June 9, 1989.</p> <p><i>The heater treater reboiler does not use a heat transfer medium and is less than 10 MMBtu/hr, therefore it is not affected facilities under this subpart.</i></p>
NSPS IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (ICE)	<p>Subpart IIII applies to manufacturers, owners, and operators of compression ignition ICE.</p> <p><i>The facility does not include compression ignited internal combustion engines; therefore, this subpart does not apply.</i></p>
NSPS JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (ICE)	<p>Subpart JJJJ applies to manufacturers, owners, and operators of spark ignition ICE.</p> <p><i>The facility does not include spark ignition, natural gas-fired engines; therefore, this subpart does not apply.</i></p>
NSPS OOOO	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After August 23, 2011 and On or Before September 18, 2015	<p>This subpart establishes standards for emission sources at oil and gas production facilities that were constructed after August 23, 2011 and on or before September 18, 2015.</p> <p><i>The new produced water tanks were constructed after September 18, 2015, and therefore, are not be subject to Subpart OOOO.</i></p>

<b>Table 4-2. Federal Standard Applicability</b>		
<b>Federal Standard</b>	<b>Name</b>	<b>Applicability</b>
NSPS OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015	<p>This subpart establishes standards for emission sources at oil and gas production facilities that were constructed after September 18, 2015.</p> <p>The new produced water tanks were constructed after September 18, 2015 and are therefore potentially subject to this subpart. The rule includes requirements for natural gas gathering and boosting stations for storage tanks (95% reduction in VOC emissions if the documented potential to emit &gt; 6 tpy,) pneumatic controllers (gas bleed limits) and fugitives.</p> <p>Storage Vessel Affected Facility: The new produced water storage tanks at the facility are not subject to NSPS OOOOa since the tanks are controlled with VOC emissions being less than 6 tpy/tank.</p> <p>Pneumatic controller affected facility: All continuous bleed pneumatic controllers must be low (<math>\leq 6</math> scf/hr natural gas bleed rate) or no bleed. All continuous pneumatic controllers at the facility are low bleed and as such the tagging and reporting requirements of this subpart are not applicable.</p> <p>Fugitive Monitoring: Under OOOOa, subject production facilities must monitor for equipment leaks using optical gas imaging (OGI) or approved alternate method. Subject facilities must have an OGI monitoring plan and conduct initial leak monitoring survey within 60 days of startup. VHGS will comply with the monitoring, recordkeeping and reporting requirement.</p>
<b>Maximum Achievable Control Technology</b>		
MACT HH	National Emissions Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities	<p>This subpart establishes emission standards and control requirements for oil and natural gas production facilities at both major and area sources.</p> <p>The facility does not include a glycol dehydration; therefore, this subpart does not apply.</p>

Table 4-2. Federal Standard Applicability		
Federal Standard	Name	Applicability
MACT ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)	<p>This subpart applies to all spark and compression ignition ICE.</p> <p>The facility does not include spark or compression ignition engines; therefore, this subpart does not apply.</p>
MACT JJJJJ	National Emissions Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources	<p>This subpart applies to boilers at area sources of HAPs.</p> <p>The heater treater burner does not meet the definition of a boiler under 40 CFR §63.11237. Further, the burner is gas-fired and meet the exemption under 40 CFR §63.11195(e).</p>

## **APPENDIX A**

### **TRIBAL NSR REGISTRATION FORM FOR EXISTING SOURCES**





**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN  
COUNTRY  
40 CFR 49.151**

**Registration for Existing Sources  
(FORM REG)**

**Use of this information request form is voluntary and not yet approved by the Office of Management and Budget.** The following is a check list of the type of information that Region 8 will use to process information on your registration. While submittal of this form is not required, it does offer details on the information we will use to complete your registration and providing the information requested will help build an existing source emissions inventory. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

**Please submit information to following two entities:**

Federal Minor NSR Permit Coordinator  
U.S. EPA, Region 8  
1595 Wynkoop Street, 8P-AR  
Denver, CO 80202-1129  
[R8airpermitting@epa.gov](mailto:R8airpermitting@epa.gov)

For more information, visit:  
<http://www.epa.gov/caa-permitting/tribal-nsr-permitting-region-8>

The Tribal Environmental Contact for the specific reservation:

Three Affiliated Tribes Environmental Division  
404 Frontage Road  
New Town, ND 58763

[R8airpermitting@epa.gov](mailto:R8airpermitting@epa.gov)

**A. GENERAL SOURCE INFORMATION**

1. (a) <b>Company Name</b> (Who owns this facility?) Van Hook Gathering Services, LLC  (b) <b>Operator Name</b> (Is the company that operates this facility different than the company that owns this facility? What is the name of the company?) MCP Operating, LLC		2. <b>Facility Name</b> Van Hook Gathering System CDP	
3. Type of Operation Oil Tank Battery and SWD		4. Portable Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 5. Temporary Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
6. NAICS Code 213111		7. SIC Code 1311	
8. Physical Address (Or, home base for portable sources) There is no street address, closest city is New Town, ND 58763			
9. Reservation* Fort Berthold Indian Reservation	10. County* Mountrail	11a. Latitude (decimal format)* 47.8429	11b. Longitude (decimal format)* -102.4066
12a. Quarter Quarter Section* E ½ of NE 1/4	12b. Section* 2	12c. Township* 150 North	12d. Range* 92 West

\* Provide all locations of operation for portable sources

**B. CONTACT INFORMATION**

<b>Company Contact</b> (Who is the <u>primary</u> contact for the company that owns this facility?) Michael Faulk		Title EHS&C Coordinator
Mailing Address 1221 Lamar, Suite 1950, Houston, Texas 77010		
Email Address Michael.Faulk@mcpoperating.com		
Telephone Number (337) 569-2286, x89009	Facsimile Number (337) 569-2217	
<b>Operator Contact</b> (Is the company that operates this facility different than the company that owns this facility? Who is the <u>primary</u> contact for the company that operates this source?) Nathan Griffith		Title Operations Manager
Mailing Address 4918 Gulf Beach Highway Cameron, LA 70631		
Email Address Nathan.Griffith@mcpoperating.com		
Telephone Number (337) 422-2037	Facsimile Number (337) 569-2217	
<b>Permitting Contact</b> (Who is the person <u>primarily</u> responsible for Clean Air Act permitting for the company? We are seeking one main contact for the company. Please do not list consultants.) Michael Faulk		Title EHS&C Coordinator
Mailing Address 1221 Lamar, Suite 1950, Houston, Texas 77010		
Email Address Michael.Faulk@mcpoperating.com		
Telephone Number (337) 569-2286, x89009	Facsimile Number (337) 569-2217	
<b>Compliance Contact</b> (Is the person responsible for Clean Air Act compliance for this company different than the person responsible for Clean Air Act permitting? Who is the person <u>primarily</u> responsible for Clean Air Act compliance for the company? We are seeking one main contact for the company. Please do not list consultants.) Michael Faulk		Title EHS&C Coordinator
Mailing Address 1221 Lamar, Suite 1950, Houston, Texas 77010		
Email Address Michael.Faulk@mcpoperating.com		
Telephone Number (337) 569-2286, x89009	Facsimile Number (337) 569-2217	

**C. ATTACHMENTS****Include all of the following information as attachments to this form**

- ☒ Narrative description of the operations
- ☒ Identification and description of all emission units and air pollution generating activities (with the exception of the exempt emissions units and activities listed in §49.153(c))
- ☒ Identification and description of any existing air pollution control equipment and compliance monitoring devices or activities
- ☒ Type and amount of each fuel used
- ☒ Type raw materials used
- ☒ Production Rates
- ☒ Operating Schedules
- ☒ Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated NSR pollutants at your source.
- ☒ Total allowable (potential to emit if there are no legally and practically enforceable restrictions) emissions from the air pollution source for the following air pollutants: particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, sulfur oxides (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.
- ☒ Estimates of the total actual emissions from the air pollution source for the following air pollutants: particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, sulfur oxides (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.
- ☐ Other

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

**D. TABLE OF ESTIMATED EMISSIONS**

The following estimates of the total emissions in tons/year for all pollutants contained in your worksheet stated above should be provided.

<b>Pollutant</b>	<b>Total Actual Emissions (tpy)</b>	<b>Total Allowable or Potential Emissions (TPY)</b>	
<b>PM</b>	<b>0.02</b>	<b>0.02</b>	PM - Particulate Matter PM <sub>10</sub> - Particulate Matter less than 10 microns in size PM <sub>2.5</sub> - Particulate Matter less than 2.5 microns in size SO <sub>2</sub> - Sulfur Oxides NO <sub>x</sub> - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H <sub>2</sub> SO <sub>4</sub> - Sulfuric Acid Mist H <sub>2</sub> S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
<b>PM<sub>10</sub></b>	<b>0.02</b>	<b>0.02</b>	
<b>PM<sub>2.5</sub></b>	<b>0.02</b>	<b>0.02</b>	
<b>SO<sub>2</sub></b>	<b>0</b>	<b>0</b>	
<b>NO<sub>x</sub></b>	<b>0.33</b>	<b>0.33</b>	
<b>CO</b>	<b>0.29</b>	<b>0.29</b>	
<b>VOC</b>	<b>0.05</b>	<b>0.05</b>	
<b>Pb</b>	<b>0</b>	<b>0</b>	
<b>Fluorides</b>	<b>0</b>	<b>0</b>	
<b>H<sub>2</sub>SO<sub>4</sub></b>	<b>0</b>	<b>0</b>	
<b>H<sub>2</sub>S</b>	<b>2.12E-05</b>	<b>2.12E-05</b>	
<b>TRS</b>	<b>0</b>	<b>0</b>	
<b>RSC</b>	<b>0</b>	<b>0</b>	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

- (a) Coal cleaning plants (with thermal dryers);
- (b) Kraft pulp mills;
- (c) Portland cement plants;
- (d) Primary zinc smelters;
- (e) Iron and steel mills;
- (f) Primary aluminum ore reduction plants;
- (g) Primary copper smelters;
- (h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
- (i) Hydrofluoric, sulfuric, or nitric acid plants;
- (j) Petroleum refineries;
- (k) Lime plants;
- (l) Phosphate rock processing plants;
- (m) Coke oven batteries;
- (n) Sulfur recovery plants;
- (o) Carbon black plants (furnace process);
- (p) Primary lead smelters;
- (q) Fuel conversion plants;
- (r) Sintering plants;
- (s) Secondary metal production plants;
- (t) Chemical process plants
- (u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
- (v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
- (w) Taconite ore processing plants;
- (x) Glass fiber processing plants;
- (y) Charcoal production plants;
- (z) Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, and
- (aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

## **APPENDIX B**

### **EMISSION CALCULATIONS**

Uncontrolled Maximum Air Pollutant Emission Rates (PTE)

Emission Source	Equipment ID	VOC		NO <sub>x</sub>		CO		PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		H <sub>2</sub> S		Benzene		Formaldehyde		HAP	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	0.06	0.28	--	--	--	--	--	--	--	--	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 32	0.06	0.28	--	--	--	--	--	--	--	--	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 33	0.06	0.28	--	--	--	--	--	--	--	--	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 34	0.06	0.28	--	--	--	--	--	--	--	--	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Produced Water Tank	Tank 35	0.06	0.28	--	--	--	--	--	--	--	--	--	--	--	--	1.17E-04	5.14E-04	--	--	2.64E-03	0.01
Heater Treater Burner	HT-2	4.04E-03	0.02	0.07	0.32	0.06	0.27	0.01	0.02	0.01	0.02	4.41E-04	1.93E-03	4.84E-06	2.12E-05	1.54E-06	6.76E-06	5.51E-05	2.42E-04	1.39E-03	0.01
TOTAL EMISSIONS:		0.32	1.40	0.07	0.32	0.06	0.27	0.01	0.02	0.01	0.02	4.41E-04	1.93E-03	4.84E-06	2.12E-05	5.88E-04	2.58E-03	5.51E-05	2.42E-04	0.01	0.06



Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Emissions Summary

Controlled Maximum Air Pollutant Emission Rates (PTE)

Emission Source	Equipment ID	VOC		NO <sub>x</sub>		CO		PM <sub>10</sub>		PM <sub>2.5</sub>		SO <sub>2</sub>		H <sub>2</sub> S		Benzene		Formaldehyde		HAP	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 32	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 33	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 34	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Produced Water Tank	Tank 35	1.27E-03	0.01	1.74E-04	7.63E-04	9.48E-04	4.15E-03	1.91E-05	8.36E-05	1.91E-05	8.36E-05	--	--	--	--	2.35E-06	1.03E-05	--	--	5.28E-05	2.31E-04
Heater Treater Burner	HT-2	4.04E-03	0.02	0.07	0.32	0.06	0.27	0.01	0.02	0.01	0.02	4.41E-04	1.93E-03	4.84E-06	2.12E-05	1.54E-06	6.76E-06	5.51E-05	2.42E-04	1.39E-03	0.01
TOTAL EMISSIONS:		0.01	0.05	0.07	0.33	0.07	0.29	0.01	0.02	0.01	0.02	4.41E-04	1.93E-03	4.84E-06	2.12E-05	1.33E-05	5.82E-05	5.51E-05	2.42E-04	1.65E-03	0.01

Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Emissions Summary

Controlled Greenhouse Gas Emission Rates (PTE)

Emission Source	Equipment ID	CO <sub>2</sub>		CH <sub>4</sub>		N <sub>2</sub> O		CO <sub>2</sub> e	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Produced Water Tank	Tank 31	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 32	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 33	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 34	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Produced Water Tank	Tank 35	0.30	1.31	1.57E-05	6.89E-05	5.64E-07	2.47E-06	0.30	1.32
Heater Treater Burner	HT-2	88.24	386.47	1.69E-03	0.01	1.62E-03	0.01	88.76	388.77
TOTAL EMISSIONS:		89.73	393.04	1.77E-03	0.01	1.62E-03	0.01	90.26	395.34

**Van Hook Gathering Services, LLC**  
**Van Hook Gathering System CDP**  
**Facility Information**

**Oil and Gas Site General Information**

**Administrative Information**

Company Name	Van Hook Gathering Services, LLC
Facility/Well Name	Van Hook Gathering System CDP
Nearest City/Town	New Town
Latitude/Longitude	47.84295, -102.40851
County	Mountrail

**Technical Information**

Produced Water Throughput (bbl/day):	30,000.00
Produced Water Throughput (bbl/year):	10,950,000.00
Are there any sour gas streams at this site?	No

<b><u>Equipment/Process Types</u></b>	<b><u>How many for this project?</u></b>
IC Engines	0
Turbines	0
Diesel Engines	0
Heaters-Boilers	1
Separators	1
Gunbarrel Vessels	0
Produced Water Tanks	5
Miscellaneous Tanks	0
Loading Jobs	0
Glycol Units	0
Amine Units	0
Vapor Recovery Units	0
Flares-Vapor Combustors	0
Thermal Oxidizers	0
MSS	NO

Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Physical Properties

Process Streams		Entrained Oil	GB Flashing Emissions	GB Water to Tanks	PW Loading Emissions	PW Tank Flashing Emissions	PW Tank W&B Emissions	PW Tanks Hourly Flashing	Total PW Tank Emissions	Water	Water to Gunbarrel	Water to Injection	zGunbarrel Hrly Flashing	zGunbarrel W&B
Composition	Status: From	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	Block: To Block:	--	Gunbarrel	Gunbarrel	--	PW Tanks	--	--	PW Tank Mixer	--	MIX-100	PW Tanks	--	--
Std. Vapor Volumetric Flow		MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD	MMSCFD
CO2		--	--	--	--	--	--	--	--	--	--	--	--	--
H2S		--	--	--	--	--	--	--	--	--	--	--	--	--
N2		6.28E-04	--	6.28E-04	9.93E-06	--	2.94E-06	--	2.94E-06	--	6.28E-04	6.28E-04	--	2.72E-06
Methane		7.06E-05	--	7.06E-05	1.51E-06	--	4.46E-07	--	4.46E-07	--	7.06E-05	7.06E-05	--	4.14E-07
Ethane		1.59E-03	--	1.59E-03	2.17E-05	--	6.41E-06	--	6.41E-06	--	1.59E-03	1.59E-03	--	5.94E-06
Propane		0.01	--	0.01	2.72E-05	--	8.05E-06	--	8.05E-06	--	0.01	0.01	--	7.47E-06
Isobutane		1.29E-03	--	1.29E-03	1.28E-06	--	3.79E-07	--	3.79E-07	--	1.29E-03	1.29E-03	--	3.51E-07
n-Butane		0.01	--	0.01	4.71E-06	--	1.39E-06	--	1.39E-06	--	0.01	0.01	--	1.29E-06
Isopentane		3.28E-03	--	3.28E-03	7.62E-07	--	2.25E-07	--	2.25E-07	--	3.28E-03	3.28E-03	--	2.09E-07
n-Pentane		0.01	--	0.01	1.11E-06	--	3.28E-07	--	3.28E-07	--	0.01	0.01	--	3.04E-07
Cyclopentane		--	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane		0.02	--	0.02	7.27E-07	--	2.15E-07	--	2.15E-07	--	0.02	0.02	--	1.99E-07
Cyclohexane		--	--	--	--	--	--	--	--	--	--	--	--	--
i-C6		0.02	--	0.02	1.12E-06	--	3.31E-07	--	3.31E-07	--	0.02	0.02	--	3.07E-07
n-Heptane		0.06	--	0.06	7.15E-07	--	2.12E-07	--	2.12E-07	--	0.06	0.06	--	1.96E-07
Methylcyclohexane		--	--	--	--	--	--	--	--	--	--	--	--	--
2,2,4-Trimethylpentane		0.01	--	0.01	8.99E-08	--	2.66E-08	--	2.66E-08	--	0.01	0.01	--	2.47E-08
Benzene		1.75E-03	--	1.75E-03	4.63E-08	--	1.37E-08	--	1.37E-08	--	1.75E-03	1.75E-03	--	1.27E-08
Toluene		2.90E-03	--	2.90E-03	2.08E-08	--	6.15E-09	--	6.15E-09	--	2.90E-03	2.90E-03	--	5.71E-09
Ethylbenzene		1.73E-03	--	1.73E-03	3.90E-09	--	1.15E-09	--	1.15E-09	--	1.73E-03	1.73E-03	--	1.07E-09
m-Xylene		0.01	--	0.01	2.26E-08	--	6.67E-09	--	6.67E-09	--	0.01	0.01	--	6.18E-09
n-Octane		0.03	--	0.03	1.06E-07	--	3.14E-08	--	3.14E-08	--	0.03	0.03	--	2.91E-08
n-Nonane		0.02	--	0.02	2.17E-08	--	6.41E-09	--	6.41E-09	--	0.02	0.02	--	5.95E-09
Water		--	--	219.07	1.15E-03	--	3.41E-04	--	3.41E-04	219.07	219.07	219.07	--	3.17E-04
TEG		--	--	--	--	--	--	--	--	--	--	--	--	--
C10+		0.05	--	0.05	2.37E-09	--	7.00E-10	--	7.00E-10	--	0.05	0.05	--	6.49E-10
Mass Fraction														
CO2		--	--	--	--	--	--	--	--	--	--	--	--	--
H2S		--	--	--	--	--	--	--	--	--	--	--	--	--
N2		6.24E-04		4.43E-06	0.01		0.01		0.01	--	4.43E-06	4.43E-06		0.01
Methane		4.01E-05		2.85E-07	1.02E-03		1.02E-03		1.02E-03	--	2.85E-07	2.85E-07		1.02E-03
Ethane		1.69E-03		1.20E-05	0.03		0.03		0.03	--	1.20E-05	1.20E-05		0.03
Propane		0.01		1.05E-04	0.05		0.05		0.05	--	1.05E-04	1.05E-04		0.05
Isobutane		2.67E-03		1.89E-05	3.14E-03		3.14E-03		3.14E-03	--	1.89E-05	1.89E-05		3.14E-03
n-Butane		0.01		1.04E-04	0.01		0.01		0.01	--	1.04E-04	1.04E-04		0.01
Isopentane		0.01		5.96E-05	2.32E-03		2.32E-03		2.32E-03	--	5.96E-05	5.96E-05		2.32E-03
n-Pentane		0.02		1.20E-04	3.37E-03		3.37E-03		3.37E-03	--	1.20E-04	1.20E-04		3.37E-03
Cyclopentane		--		--	--		--		--	--	--	--		--
n-Hexane		0.05		3.56E-04	2.64E-03		2.64E-03		2.64E-03	--	3.56E-04	3.56E-04		2.64E-03
Cyclohexane		--		--	--		--		--	--	--	--		--
i-C6		0.05		3.79E-04	4.07E-03		4.07E-03		4.07E-03	--	3.79E-04	3.79E-04		4.07E-03
n-Heptane		0.21		1.52E-03	3.02E-03		3.02E-03		3.02E-03	--	1.52E-03	1.52E-03		3.02E-03
Methylcyclohexane		--		--	--		--		--	--	--	--		--
2,2,4-Trimethylpentane		0.03		1.94E-04	4.33E-04		4.33E-04		4.33E-04	--	1.94E-04	1.94E-04		4.33E-04
Benzene		4.83E-03		3.43E-05	1.52E-04		1.52E-04		1.52E-04	--	3.43E-05	3.43E-05		1.52E-04
Toluene		0.01		6.72E-05	8.09E-05		8.09E-05		8.09E-05	--	6.72E-05	6.72E-05		8.09E-05
Ethylbenzene		0.01		4.63E-05	1.75E-05		1.75E-05		1.75E-05	--	4.63E-05	4.63E-05		1.75E-05
m-Xylene		0.03		2.23E-04	1.01E-04		1.01E-04		1.01E-04	--	2.23E-04	2.23E-04		1.01E-04
n-Octane		0.13		9.28E-04	5.11E-04		5.11E-04		5.11E-04	--	9.28E-04	9.28E-04		5.11E-04
n-Nonane		0.11		7.74E-04	1.17E-04		1.17E-04		1.17E-04	--	7.74E-04	7.74E-04		1.17E-04
Water		--		0.99	0.88		0.88		0.88	1.00	0.99	0.99		0.88
TEG		--		--	--		--		--	--	--	--		--
C10+		0.30	--	2.16E-03	1.65E-05	--	1.65E-05	--	1.65E-05	--	2.16E-03	2.16E-03	--	1.65E-05

Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Physical Properties

Process Streams		Entrained Oil	GB Flashing Emissions	GB Water to Tanks	PW Loading Emissions	PW Tank Flashing Emissions	PW Tank W&B Emissions	PW Tanks Hourly Flashing	Total PW Tank Emissions	Water	Water to Gunbarrel	Water to Injection	zGunbarrel Hrly Flashing	zGunbarrel W&B
Composition	Status: From Block: To Block:	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total		--	Gunbarrel	Gunbarrel	--	PW Tanks	--	--	PW Tank Mixer	--	MIX-100	PW Tanks	--	--
Mole Fraction		MIX-100	--	PW Tanks	--	--	PW Tank Mixer	--	--	MIX-100	Gunbarrel	--	--	--
CO2		--		--	--		--		--	--	--	--		--
H2S		--		--	--		--		--	--	--	--		--
N2		2.47E-03		2.87E-06	0.01		0.01		0.01	--	2.87E-06	2.87E-06		0.01
Methane		2.78E-04		3.22E-07	1.23E-03		1.23E-03		1.23E-03	--	3.22E-07	3.22E-07		1.23E-03
Ethane		0.01		7.23E-06	0.02		0.02		0.02	--	7.23E-06	7.23E-06		0.02
Propane		0.04		4.33E-05	0.02		0.02		0.02	--	4.33E-05	4.33E-05		0.02
Isobutane		0.01		5.90E-06	1.05E-03		1.05E-03		1.05E-03	--	5.90E-06	5.90E-06		1.05E-03
n-Butane		0.03		3.23E-05	3.84E-03		3.84E-03		3.84E-03	--	3.23E-05	3.23E-05		3.84E-03
Isopentane		0.01		1.50E-05	6.21E-04		6.21E-04		6.21E-04	--	1.50E-05	1.50E-05		6.21E-04
n-Pentane		0.03		3.02E-05	9.04E-04		9.04E-04		9.04E-04	--	3.02E-05	3.02E-05		9.04E-04
Cyclopentane		--		--	--		--		--	--	--	--		--
n-Hexane		0.06		7.48E-05	5.93E-04		5.93E-04		5.93E-04	--	7.48E-05	7.48E-05		5.93E-04
Cyclohexane		--		--	--		--		--	--	--	--		--
i-C6		0.07		7.98E-05	9.14E-04		9.14E-04		9.14E-04	--	7.98E-05	7.98E-05		9.14E-04
n-Heptane		0.24		2.74E-04	5.84E-04		5.84E-04		5.84E-04	--	2.74E-04	2.74E-04		5.84E-04
Methylcyclohexane		--		--	--		--		--	--	--	--		--
2,2,4-Trimethylpentane		0.03		3.08E-05	7.34E-05		7.34E-05		7.34E-05	--	3.08E-05	3.08E-05		7.34E-05
Benzene		0.01		7.96E-06	3.77E-05		3.77E-05		3.77E-05	--	7.96E-06	7.96E-06		3.77E-05
Toluene		0.01		1.32E-05	1.70E-05		1.70E-05		1.70E-05	--	1.32E-05	1.32E-05		1.70E-05
Ethylbenzene		0.01		7.90E-06	3.18E-06		3.18E-06		3.18E-06	--	7.90E-06	7.90E-06		3.18E-06
m-Xylene		0.03		3.80E-05	1.84E-05		1.84E-05		1.84E-05	--	3.80E-05	3.80E-05		1.84E-05
n-Octane		0.13		1.47E-04	8.65E-05		8.65E-05		8.65E-05	--	1.47E-04	1.47E-04		8.65E-05
n-Nonane		0.09		1.09E-04	1.77E-05		1.77E-05		1.77E-05	--	1.09E-04	1.09E-04		1.77E-05
Water		--		1.00	0.94		0.94		0.94	1.00	1.00	1.00		0.94
TEG		--		--	--		--		--	--	--	--		--
C10+		0.21	--	2.38E-04	1.93E-06	--	1.93E-06	--	1.93E-06	--	2.38E-04	2.38E-04	--	1.93E-06
Mass Flow		--	--	--	--	--	--	--	--	--	--	--	--	--
CO2		--	--	--	--	--	--	--	--	--	--	--	--	--
H2S		--	--	--	--	--	--	--	--	--	--	--	--	--
N2		1.93	--	1.93	0.03	--	0.01	--	0.01	--	1.93	1.93	--	0.01
Methane		0.12	--	0.12	2.66E-03	--	7.86E-04	--	7.86E-04	--	0.12	0.12	--	7.29E-04
Ethane		5.23	--	5.23	0.07	--	0.02	--	0.02	--	5.23	5.23	--	0.02
Propane		46.01	--	46.01	0.13	--	0.04	--	0.04	--	46.01	46.01	--	0.04
Isobutane		8.26	--	8.26	0.01	--	2.42E-03	--	2.42E-03	--	8.26	8.26	--	2.24E-03
n-Butane		45.27	--	45.27	0.03	--	0.01	--	0.01	--	45.27	45.27	--	0.01
Isopentane		26.01	--	26.01	0.01	--	1.78E-03	--	1.78E-03	--	26.01	26.01	--	1.65E-03
n-Pentane		52.40	--	52.40	0.01	--	2.60E-03	--	2.60E-03	--	52.40	52.40	--	2.41E-03
Cyclopentane		--	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane		155.17	--	155.17	0.01	--	2.03E-03	--	2.03E-03	--	155.17	155.17	--	1.89E-03
Cyclohexane		--	--	--	--	--	--	--	--	--	--	--	--	--
i-C6		165.55	--	165.55	0.01	--	3.13E-03	--	3.13E-03	--	165.55	165.55	--	2.91E-03
n-Heptane		661.24	--	661.24	0.01	--	2.33E-03	--	2.33E-03	--	661.24	661.24	--	2.16E-03
Methylcyclohexane		--	--	--	--	--	--	--	--	--	--	--	--	--
2,2,4-Trimethylpentane		84.65	--	84.65	1.13E-03	--	3.34E-04	--	3.34E-04	--	84.65	84.65	--	3.09E-04
Benzene		14.98	--	14.98	3.97E-04	--	1.17E-04	--	1.17E-04	--	14.98	14.98	--	1.09E-04
Toluene		29.34	--	29.34	2.11E-04	--	6.23E-05	--	6.23E-05	--	29.34	29.34	--	5.77E-05
Ethylbenzene		20.20	--	20.20	4.55E-05	--	1.35E-05	--	1.35E-05	--	20.20	20.20	--	1.25E-05
m-Xylene		97.22	--	97.22	2.63E-04	--	7.78E-05	--	7.78E-05	--	97.22	97.22	--	7.21E-05
n-Octane		405.05	--	405.05	1.33E-03	--	3.93E-04	--	3.93E-04	--	405.05	405.05	--	3.65E-04
n-Nonane		337.63	--	337.63	3.05E-04	--	9.03E-05	--	9.03E-05	--	337.63	337.63	--	8.37E-05
Water		--	--	433,325.97	2.28	--	0.68	--	0.68	433,325.97	433,325.97	433,325.97	--	0.63
TEG		--	--	--	--	--	--	--	--	--	--	--	--	--
C10+		942.06	--	942.06	4.28E-05	--	1.27E-05	--	1.27E-05	--	942.06	942.06	--	1.17E-05
Temperature	°F	82.00	43.67	43.67	56.94	43.67	56.94	56.94	56.94	82.00	82.00	43.67	56.94	56.94
Pressure	psig	61.00	--	--	-1.36E+01	--	-1.36E+01	--	-1.36E+01	61.00	61.00	--	--	-1.36E+01
Molecular Weight	lb/lbmol	111.14		18.12	19.34		19.34		19.34	18.02	18.12	18.12		19.34
Gross Ideal Gas Heating Value	Btu/ft^3	6,019.56		57.22	169.68		169.68		169.68	50.31	57.22	57.22		169.68
Mass Flow	lb/h	3,098.34	--	436,424.31	2.60	--	0.77	--	0.77	433,325.97	436,424.31	436,424.31	--	0.71
Std Vapor Volumetric Flow	MMSCFD	0.25	--	219.32	1.23E-03	--	3.62E-04	--	3.62E-04	219.07	219.32	219.32	--	3.36E-04
Std Liquid Volumetric Flow	Mbbl/d	0.30	--	30.00	2.00E-04	--	5.93E-05	--	5.93E-05	29.70	30.00	30.00	--	5.49E-05
Net Ideal Gas Heating Value	Btu/ft^3	5,598.91		6.48	112.48		112.48		112.48	--	6.48	6.48		112.48

Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Heater Treater Burners

Background Information	
Emission Source:	Heater Treater Burners (Each)
Equipment ID:	HT-2
Heater/Boiler rating (MMBtu/hr):	0.75
Rating above is:	below 100 MMBtu/hr, uncontrolled
Operating hours/year:	8760
Natural Gas Heat Value (Btu/scf) <sup>a</sup> :	1,020
Fuel Rate (scf/hr):	735
Fuel Rate (scf/yr) <sup>a</sup> :	6,441,176

<sup>a</sup> Heating value for natural gas taken from Section 1.4 of AP-42 (dated 7/98).

<sup>b</sup> From AP-42 Section 1.4

Pollutant	Emission Factor <sup>a</sup> (lb/10 <sup>6</sup> scf)	lb/hr	tpy
VOC	5.5	4.04E-03	0.02
NOx	100	0.07	0.32
CO	84	0.06	0.27
PM <sub>10</sub>	7.6	0.01	0.02
PM <sub>2.5</sub>	7.6	0.01	0.02
SO <sub>2</sub>	0.6	4.41E-04	1.93E-03
HAPS			
Arsenic	0.0002	1.47E-07	6.44E-07
Benzene	0.0021	1.54E-06	6.76E-06
Beryllium	0.000012	8.82E-09	3.86E-08
Cadmium	0.0011	8.09E-07	3.54E-06
Chromium	0.0014	1.03E-06	4.51E-06
Cobalt	0.000084	6.18E-08	2.71E-07
Dichlorobenzene	0.0012	8.82E-07	3.86E-06
Formaldehyde	0.075	5.51E-05	2.42E-04
n-Hexane	1.8	1.32E-03	0.01
Lead	0.0005	3.68E-07	1.61E-06
Manganese	0.00038	2.79E-07	1.22E-06
Mercury	0.00026	1.91E-07	8.37E-07
Naphthalene	0.00061	4.49E-07	1.96E-06
Nickel	0.0021	1.54E-06	6.76E-06
POM	0.000088	6.47E-08	2.83E-07
Toluene	0.0034	2.50E-06	1.10E-05
Selenium	0.000024	1.76E-08	7.73E-08
Total HAPs		1.39E-03	0.01
Other Pollutants			
H <sub>2</sub> S	N/A <sup>c</sup>	4.84E-06	2.12E-05

<sup>a</sup> Emission factors are taken from AP-42, Chapter 1, Tables 1.4-1 & 1.4-2 dated July 1998.

<sup>c</sup> H<sub>2</sub>S emissions are conservatively based on 98% conversion of H<sub>2</sub>S to SO<sub>2</sub>.

<sup>d</sup> Greenhouse Gas Factors from AP-42, Table 1.4.2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion.

<sup>e</sup> Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.

H <sub>2</sub> S Max Concentration (ppmv)	H <sub>2</sub> S Mass to Heater Treater	H <sub>2</sub> S Mass to Heater Treater (tpy)
3.66	2.42E-04	1.06E-03

<sup>a</sup> H<sub>2</sub>S Mass to Heater Treater (lb/hr) = H<sub>2</sub>S Max Concentration (ppmv) /10<sup>6</sup> \* Fuel Rate (scf/hr) / Standard Molar Volume (scf/lbmol) \* H<sub>2</sub>S MW (lb/lbmol)

Example Calculation (VOC):

EMISSION FACTOR	FEED RATE PER HOUR	HOURLY EMISSIONS	ANNUAL OPERATING HOURS	WEIGHT CONVERSION	ANNUAL EMISSIONS
5.5 lb VOC MMscf Natural Gas Burned	x 0.0007 MMscf hr	= 0.00 lb VOC hr	x 8,760 hours yr	x 1 ton 2,000 lbs	= 0.02 tons VOC yr

Criteria Pollutant Emission Factors obtained from AP-42 Nat Gas Combustion, Table 1.4-1, (7/98) < 100 MMBtu/hr heat input; & Table 1.4-2, (7/98).

Parameter	Value
scf/lbmole	379.3
Btu/MMBtu	1,000,000
scf/MMscf	1,000,000
lb/ton	2,000
H2S molecular weight	34.08
SO2 molecular weight	64.06

GHG Pollutant Emissions <sup>d,e</sup>		
GHG CO <sub>2</sub> Factor:	120,000	lb/MMscf
GHG CH <sub>4</sub> Factor:	2.3	lb/MMscf
GHG N <sub>2</sub> O Factor:	2.2	lb/MMscf
GWP CO <sub>2</sub> Equivalent:	1	
GWP CH <sub>4</sub> Equivalent:	25	
GWP N <sub>2</sub> O Equivalent:	298	
CO <sub>2</sub> emissions:	386.47	tpy
CH <sub>4</sub> emissions:	0.01	tpy
N <sub>2</sub> O emissions:	0.01	tpy
CO <sub>2</sub> e emissions:	388.77	tpy



Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Produced Water Tanks

Identification - Vertical Fixed Roof Vessel		
	Emission Source	Produced Water Tanks (Each)
	Equipment ID	Tanks 31-35
	Throughput (BPD)	2,727
	Throughput (BPY)	995,455
Tank Dimensions		
	Shell Height (ft)	20.0
	Diameter (ft)	12.0
	Volume (gal)	16,800
Other Inputs		
	Shell & Roof Color/Shade <sup>a</sup>	Light Grey
	Shell & Roof Condition	Good
	Meteorological Data	Williston, ND
	Controlled?	Yes
	Control Equipment	Flare
Tank Contents		
	RVP	8.00
Total Uncontrolled Tank VOC Emissions <sup>b</sup>		
	VOC Flashing Losses (ton/yr)	--
	VOC Working & Breathing Losses (ton/yr)	0.28
	Total VOC Losses (ton/yr)	0.28

Notes  
<sup>a</sup> Dark Green paint color selected in ProMax options to simulate Dark Green paint.  
<sup>b</sup> From ProMax AP-42 Emissions Report

Uncontrolled Produced Water Tank Emissions

Component	Produced Water Tanks (Each)					
	Flashing (lb/hr)	Working and Breathing (lb/hr)	Total (lb/hr)	Flashing (TPY)	Working and Breathing (TPY)	Total (TPY)
CO2	--	--	--	--	--	--
H2S	--	--	--	--	--	--
N2	--	0.01	0.01	--	0.04	0.04
Methane	--	7.86E-04	7.86E-04	--	3.44E-03	3.44E-03
Ethane	--	0.02	0.02	--	0.09	0.09
Propane	--	0.04	0.04	--	0.17	0.17
Isobutane	--	2.42E-03	2.42E-03	--	0.01	0.01
n-Butane	--	0.01	0.01	--	0.04	0.04
Isopentane	--	1.78E-03	1.78E-03	--	0.01	0.01
n-Pentane	--	2.60E-03	2.60E-03	--	0.01	0.01
Cyclopentane	--	--	--	--	--	--
n-Hexane	--	2.03E-03	2.03E-03	--	0.01	0.01
Cyclohexane	--	--	--	--	--	--
i-C6	--	3.13E-03	3.13E-03	--	0.01	0.01
n-Heptane	--	2.33E-03	2.33E-03	--	0.01	0.01
Methylcyclohexane	--	--	--	--	--	--
2,2,4-Trimethylpentane	--	3.34E-04	3.34E-04	--	1.46E-03	1.46E-03
Benzene	--	1.17E-04	1.17E-04	--	5.14E-04	5.14E-04
Toluene	--	6.23E-05	6.23E-05	--	2.73E-04	2.73E-04
Ethylbenzene	--	1.35E-05	1.35E-05	--	5.89E-05	5.89E-05
m-Xylene	--	7.78E-05	7.78E-05	--	3.41E-04	3.41E-04
n-Octane	--	3.93E-04	3.93E-04	--	1.72E-03	1.72E-03
n-Nonane	--	9.03E-05	9.03E-05	--	3.96E-04	3.96E-04
Water	--	0.68	0.68	--	2.96	2.96
TEG	--	--	--	--	--	--
C10+	--	1.27E-05	1.27E-05	--	5.55E-05	5.55E-05
Total	--	0.77	0.77	--	3.37	3.37
Total CO2	--	--	--	--	--	--
Total Methane	--	7.86E-04	7.86E-04	--	3.44E-03	3.44E-03
Total CO <sub>2</sub> e	--	0.02	0.02	--	0.09	0.09
Total VOC	--	0.06	0.06	--	0.28	0.28
Total HAP	--	2.64E-03	2.64E-03	--	0.01	0.01

Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Flare - Hourly

Flare Feed Rates and Composition <sup>a,b</sup>					Flare DRE% <sup>i</sup>	Flare Exhaust Components <sup>c</sup>	Criteria Pollutant Emissions <sup>d</sup>
Component	Pilot	Produced Water Tanks Working Flashing	Produced Water Tanks Working and Breathing	Total <sup>h</sup>			
	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(%)	(lb/hr)	
CO2	--	--	--	--	0%	--	NO <sub>x</sub> factor: 0.0680 lb/MMBtu
H2S	--	--	--	--	98%	--	CO factor: 0.3700 lb/MMBtu
N2	--	--	0.01	0.01	0%	<b>0.01</b>	
Methane	--	--	7.86E-04	7.86E-04	98%	<b>1.57E-05</b>	PM <sub>10</sub> factor: 7.60 lb/MMscf
Ethane	--	--	0.02	0.02	98%	<b>4.23E-04</b>	PM <sub>2.5</sub> factor: 7.60 lb/MMscf
Propane	--	--	0.04	0.04	98%	<b>7.80E-04</b>	
Isobutane	--	--	2.42E-03	2.42E-03	98%	<b>4.84E-05</b>	NO <sub>x</sub> emissions from flare: <b>3.47E-03 lb/hr</b>
n-Butane	--	--	0.01	0.01	98%	<b>1.78E-04</b>	CO emissions from flare: <b>0.02 lb/hr</b>
Isopentane	--	--	1.78E-03	1.78E-03	98%	<b>3.57E-05</b>	SO <sub>2</sub> emissions from flare: -- lb/hr
n-Pentane	--	--	2.60E-03	2.60E-03	98%	<b>5.19E-05</b>	PM <sub>10</sub> emissions from flare: <b>3.80E-04 lb/hr</b>
Cyclopentane	--	--	--	--	98%	--	PM <sub>2.5</sub> emissions from flare: <b>3.80E-04 lb/hr</b>
n-Hexane	--	--	2.03E-03	2.03E-03	98%	<b>4.07E-05</b>	H <sub>2</sub> S emissions from flare: -- lb/hr
Cyclohexane	--	--	--	--	98%	--	<b>GHG Pollutant Emissions</b>
i-C6	--	--	3.13E-03	3.13E-03	98%	<b>6.27E-05</b>	
n-Heptane	--	--	2.33E-03	2.33E-03	98%	<b>4.65E-05</b>	
Methylcyclohexane	--	--	--	--	98%	--	GHG CO <sub>2</sub> Factor <sup>e</sup> : 116.98 lb/MMBTU GHG N <sub>2</sub> O Factor <sup>e</sup> : 2.20E-04 lb/MMBTU  GWP CO <sub>2</sub> Equivalent <sup>f</sup> : 1 GWP CH <sub>4</sub> Equivalent <sup>f</sup> : 25 GWP N <sub>2</sub> O Equivalent <sup>f</sup> : 298  CO <sub>2</sub> emissions: 5.97 lb/hr CH <sub>4</sub> emissions: 1.57E-05 lb/hr N <sub>2</sub> O emissions: 1.12E-05 lb/hr CO <sub>2</sub> e emissions: 5.97 lb/hr
2,2,4-Trimethylpentane	--	--	3.34E-04	3.34E-04	98%	<b>6.67E-06</b>	
Benzene	--	--	1.17E-04	1.17E-04	98%	<b>2.35E-06</b>	
Toluene	--	--	6.23E-05	6.23E-05	98%	<b>1.25E-06</b>	
Ethylbenzene	--	--	1.35E-05	1.35E-05	98%	<b>2.69E-07</b>	
m-Xylene	--	--	7.78E-05	7.78E-05	98%	<b>1.56E-06</b>	
n-Octane	--	--	3.93E-04	3.93E-04	98%	<b>7.87E-06</b>	
n-Nonane	--	--	9.03E-05	9.03E-05	98%	<b>1.81E-06</b>	
Water	--	--	0.68	0.68	0%	<b>0.68</b>	
TEG	--	--	--	--	98%	--	
C10+	--	--	1.27E-05	1.27E-05	98%	<b>2.53E-07</b>	
<b>Total</b>	--	--	<b>0.77</b>	<b>0.77</b>		<b>0.69</b>	
<b>Total VOC</b>	--	--	<b>0.06</b>	<b>0.06</b>		<b>1.27E-03</b>	
<b>Total HAP</b>	--	--	<b>2.64E-03</b>	<b>2.64E-03</b>		<b>5.28E-05</b>	
Heat Value of Stream (Btu/scf)	1,020.00	--	169.68	<b>1,071.26</b>			
Molecular Weight	--	--	19.34	--			
SO <sub>2</sub> emissions (lb/hr)	--	--	--	--			
Volumetric Flow (scf/hr)	50.00	--	15.10	<b>50.00</b>			
Heat Release (MMBtu/hr)	0.05	--	2.56E-03	<b>0.05</b>			

<sup>a</sup> Uncontrolled stream properties determined via ProMax.

<sup>b</sup> Gas Sales Line Downtime emissions based on "gas from slug catcher stream".

<sup>c</sup> Flare Exhaust (lb/hr) = Total Uncontrolled Emissions (lb/hr) x (100-Flare DRE (%)).

<sup>d</sup> Flare CO and NOx emission factors from AP-42 Table 13.5-1 (Emissions Factors for Flare Operations). PM and PM<sub>2.5</sub> emission factors from AP-42, Table 1.4-1 and 1.4-2, July 1998. SO<sub>2</sub> emissions assume 100% conversion of H<sub>2</sub>S to SO<sub>2</sub>.

<sup>e</sup> 40 CFR 98 Subpart C, Table C-1 and C-2. Emission Factor (lb/MMBtu) = Emission factor (kg/MMBtu) \* (2.20462 lb/kg)

<sup>f</sup> Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.

<sup>g</sup> 40 CFR 98.233 (Subpart W), equation W-40. Mass N<sub>2</sub>O = (10E-3) x scf x HHV x EF

<sup>h</sup> Pre-Control Emissions

<sup>i</sup> DRE from AP-42 Chapter 13.5

Van Hook Gathering Services, LLC  
Van Hook Gathering System CDP  
Flare - Hourly

Sample Calculations

Flare PM emissions were calculated using the following formula:

$$\begin{aligned} \text{Emissions} &= \\ \text{where,} \quad \text{Emissions} &= \\ \quad \text{EF} &= \\ \quad \text{CF} &= \\ \quad \text{THR} &= \end{aligned}$$

NO<sub>x</sub> and CO emissions were calculated using the equation below:

$$\begin{aligned} \text{Emissions} &= \\ \text{where,} \quad \text{EF} &= \\ \quad \text{THR} &= \end{aligned}$$

VOC and speciated (HAP) emissions were calculated using the equation below:

$$\begin{aligned} \text{Emissions} &= \\ \text{where,} \quad \text{MR} &= \\ \quad \text{DE}_{\text{VOC}} &= \end{aligned}$$

H<sub>2</sub>S emissions were calculated using the equation below:

$$\begin{aligned} \text{Emissions} &= \\ \text{where,} \quad \text{MR}_{\text{H}_2\text{S}} &= \\ \quad \text{DE}_{\text{H}_2\text{S}} &= \end{aligned}$$

SO<sub>2</sub> emissions were calculated assuming 100% of the H<sub>2</sub>S was converted to SO<sub>2</sub>, as shown in the equation below:

$$\begin{aligned} \text{Emissions} &= \\ \text{where,} \quad \text{MR}_{\text{H}_2\text{S}} &= \\ \quad \text{MW}_{\text{SO}_2} &= \\ \quad \text{MW}_{\text{H}_2\text{S}} &= \end{aligned}$$

Emissions were calculated separately for each fuel stream, then summed for the flare as a whole. Hourly emissions were calculated using the hourly volume of the fuel combusted. Annual emissions were calculated using the annual volume of the fuel combusted, and dividing by 2,000 lb/ton.

Flare Feed Rates and Composition <sup>a,b</sup>					Flare DRE <sup>i</sup>	Flare Exhaust Components <sup>c</sup>	Criteria Pollutant Emissions <sup>d</sup>	
Component	Pilot	Produced Water Tanks Working Flashing	Produced Water Tanks Working and Breathing	Total <sup>h</sup>				
	TPY	TPY	TPY	TPY	(%)	TPY		
CO2	--	--	--	--	0%	--	NO <sub>x</sub> factor:	0.0680 lb/MMBtu
H2S	--	--	--	--	98%	--	CO factor:	0.3700 lb/MMBtu
N2	--	--	0.04	0.04	0%	0.04		
Methane	--	--	3.44E-03	3.44E-03	98%	6.89E-05		
Ethane	--	--	0.09	0.09	98%	1.85E-03	PM <sub>10</sub> factor:	7.60 lb/MMscf
Propane	--	--	0.17	0.17	98%	3.42E-03	PM <sub>2.5</sub> factor:	7.60 lb/MMscf
Isobutane	--	--	0.01	0.01	98%	2.12E-04		
n-Butane	--	--	0.04	0.04	98%	7.78E-04	NO <sub>x</sub> emissions from flare:	0.02 ton/yr
Isopentane	--	--	0.01	0.01	98%	1.56E-04	CO emissions from flare:	0.09 ton/yr
n-Pentane	--	--	0.01	0.01	98%	2.27E-04	SO <sub>2</sub> emissions from flare:	-- ton/yr
Cyclopentane	--	--	--	--	98%	--	PM <sub>10</sub> emissions from flare:	1.75E-03 ton/yr
n-Hexane	--	--	0.01	0.01	98%	1.78E-04	PM <sub>2.5</sub> emissions from flare:	1.75E-03 ton/yr
Cyclohexane	--	--	--	--	98%	--	H <sub>2</sub> S emissions from flare:	-- ton/yr
i-C6	--	--	0.01	0.01	98%	2.75E-04		
n-Heptane	--	--	0.01	0.01	98%	2.04E-04	GHG Pollutant Emissions <sup>e,f</sup>	
Methylcyclohexane	--	--	--	--	98%	--		
2,2,4-Trimethylpentane	--	--	1.46E-03	1.46E-03	98%	2.92E-05	GHG CO <sub>2</sub> Factor <sup>g</sup> :	116.98 lb/MMBTU
Benzene	--	--	5.14E-04	5.14E-04	98%	1.03E-05	GHG N <sub>2</sub> O Factor <sup>g</sup> :	2.20E-04 lb/MMBTU
Toluene	--	--	2.73E-04	2.73E-04	98%	5.45E-06		
Ethylbenzene	--	--	5.89E-05	5.89E-05	98%	1.18E-06	GWP CO <sub>2</sub> Equivalent <sup>f</sup> :	1
m-Xylene	--	--	3.41E-04	3.41E-04	98%	6.81E-06	GWP CH <sub>4</sub> Equivalent <sup>f</sup> :	25
n-Octane	--	--	1.72E-03	1.72E-03	98%	3.45E-05	GWP N <sub>2</sub> O Equivalent <sup>f</sup> :	298.00
n-Nonane	--	--	3.96E-04	3.96E-04	98%	7.91E-06		
Water	--	--	2.96	2.96	0%	2.96		
TEG	--	--	--	--	98%	--	CO <sub>2</sub> emissions:	27.44 tpy
C10+	--	--	5.55E-05	5.55E-05	98%	1.11E-06	CH <sub>4</sub> emissions:	6.89E-05 tpy
Total	--	--	3.37	3.37		3.01	N <sub>2</sub> O emissions:	5.16E-05 tpy
Total VOC	--	--	0.28	0.28		0.01	CO <sub>2</sub> e emissions:	27.46 tpy
Total HAP	--	--	0.01	0.01		2.31E-04		
Heat Value of Stream (Btu/scf)	1,020.00	--	169.68	822.73				
Molecular Weight	--	--	19.34	--				
SO <sub>2</sub> emissions (tpy)	--	--	--	--				
Volumetric Flow (scf/yr)	438,000.00	--	132,310.02	570,310.02				
Total heat release (MMBtu/yr)	446.76	--	22.45	469.21				

<sup>a</sup> Uncontrolled stream properties determined via ProMax.

<sup>b</sup> Gas Sales Line Downtime emissions based on "gas from slug catcher stream".

<sup>c</sup> Flare Exhaust (tpy) = Total Uncontrolled Emissions (tpy) x (100-Flare DRE (%)).

<sup>d</sup> Flare CO and NOx emission factors from AP-42 Table 13.5-1 (Emissions Factors for Flare Operations). PM and PM<sub>2.5</sub> emission factors from AP-42, Table 1.4-1 and 1.4-2, July 1998. SO<sub>2</sub> emissions assume 100% conversion of H<sub>2</sub>S to SO<sub>2</sub>.

<sup>e</sup> 40 CFR 98 Subpart C, Table C-1 and C-2. Emission Factor (lb/MMBtu) = Emission factor (kg/MMBtu) \* (2.20462 lb/kg)

<sup>f</sup> Global Warming Potentials from Table A-1 of Subpart A of Part 98 for Mandatory Greenhouse Gas Reporting.

<sup>g</sup> 40CFR 98.233 (Subpart W), equation W-40. Mass N<sub>2</sub>O = (10E-3) x scf x HHV x EF

<sup>h</sup> Pre-Control Emissions

<sup>i</sup> DRE from AP-42 Chapter 13.5

## **APPENDIX C**

### **SAMPLE ANALYSIS**

# QUESTAR ENERGY SERVICES

1210 D. Street, Rock Springs, Wyoming 82901 (307) 352-7292

Description	VANHOOK CDP	Company	WPX ENERGY
Field	VANHOOK	GC Method	QUESLIQ1, GPA 2186
Analysis Date/Time	7/16/2018 9:08 AM	Data File	VANHOOK CDP.GCD
Date Sampled	7/14/2018	Sampled By	WED
Sample Temperature	82	Analyst Initials	DEM
Sample Pressure	61	Container #	40236
Sample Point	Sample port upstream of meter at LACT		

Component	Mol%	Wt%	LV%
Methane	0.0278	0.0041	0.0099
Ethane	0.6243	0.1740	0.3501
Propane	3.7429	1.5301	2.1622
Isobutane	0.5096	0.2746	0.3497
n-Butane	2.7941	1.5056	1.8471
Neopentane	0.0024	0.0016	0.0019
Isopentane	1.2910	0.8635	0.9900
n-Pentane	2.6052	1.7425	1.9802
2,2-Dimethylbutane	0.0471	0.0376	0.0412
2,3-Dimethylbutane	1.0267	0.8203	0.8823
2-Methylpentane	3.4527	2.7584	3.0051
3-Methylpentane	2.3644	1.8889	2.0234
n-Hexane	6.4591	5.1602	5.5696
Heptanes	24.3595	21.5866	21.0481
Octanes	16.5201	17.2352	17.1108
Nonanes	13.4104	15.1327	14.3604
Decanes plus	20.5158	29.2195	28.2106
Nitrogen	0.2475	0.0643	0.0571
Carbon Dioxide	ND	ND	ND
Total	100.0000	100.0000	100.0000

## Global Properties

	Units
Avg Molecular Weight	107.8713 gm/mole
Pseudocritical Pressure	416.44 psia
Pseudocritical Temperature	535.47 degF
Specific Gravity	0.71671 gm/ml
Liquid Density	5.9752 lb/gal
Liquid Density	250.96 lb/bbl
Specific Gravity	3.3642 air=1
SCF/bbl	883.88 SCF/bbl
SCF/gal	21.0447 SCF/gal
MCF/gal	0.0210 MCF/gal

## Global Properties

	Units
gal/MCF	47.527 gal/MCF
Net Heating Value	5421.8 BTU/SCF at 60°F
Net Heating Value	18946.7 BTU/lb at 60°F
Gross Heating Value	5794.0 BTU/SCF at 60°F
Gross Heating Value	20397.7 BTU/lb at 60°F
Gross Heating Value	122593.9 BTU/gal at 60°F
API Gravity	65.9
MON	34.2
RON	37.3
RVP	29.892 psia

## Comment

Description

VANHOOK CDP

Component	Mol%	Wt%	LV%
Benzene	0.6879	0.4982	0.4036
Toluene	1.1423	0.9758	0.8021
Ethylbenzene	0.6825	0.6718	0.5523
M&P Xylene	2.8782	2.8328	2.3370
O-Xylene	0.4067	0.4003	0.3243
2,2,4-Trimethylpentane	2.6582	2.8150	2.8014

## GRI E&amp;P TANK INFORMATION

Component	Mol%	Wt%	LV%
H2S	ND	ND	ND
O2	ND	ND	ND
CO2	ND	ND	ND
N2	0.2475	0.0643	0.0571
C1	0.0278	0.0041	0.0099
C2	0.6243	0.1740	0.3501
C3	3.7429	1.5301	2.1622
IC4	0.5096	0.2746	0.3497
NC4	2.7941	1.5056	1.8471
IC5	1.2934	0.8651	0.9919
NC5	2.6052	1.7425	1.9802
Hexanes	6.8909	5.5052	5.9520
Heptanes	23.6716	21.0884	20.6445
Octanes	12.7196	13.4444	13.5073
Nonanes	9.4430	11.2278	11.1468
Benzene	0.6879	0.4982	0.4036
Toluene	1.1423	0.9758	0.8021
E-Benzene	0.6825	0.6718	0.5523
Xylene	3.2849	3.2331	2.6613
n-C6	6.4591	5.1602	5.5696
2,2,4-Trimethylpentane	2.6582	2.8150	2.8014
<b>C10 Plus</b>			
C10 Mole %	20.5158	29.2195	28.2106
Molecular Wt.	164.7149		
Specific Gravity	0.7489		
Total	100.00	100.00	100.00